1. A stator support system for supporting a stator coil assembly, the stator support system comprising:

an inner support tube having an outer surface;

a plurality of spaced windings supported on the outer surface of the inner support tube, spaces between adjacent windings defining a plurality of gaps;

a plurality of wedges, each disposed within one of the plurality of gaps and having a first and second edge, the first edge configured to mechanically engage the outer surface of the inner support tube; and

a cross support positioned over the plurality of spaced windings and extending perpendicular to a longitudinal axis of the stator coil assembly, the cross support having a first edge configured to mechanically engage the second edge of the plurality of wedges.

2. The stator support system of claim 1 wherein the cross support includes a plurality of spaced cross support members, each spaced cross support member having a first edge configured to mechanically engage the second edge of the plurality of wedges.

3. The stator support system of claim 2 wherein the stator coil assembly is surrounded by a housing and each of the plurality of spaced cross support members have a second edge configured to mechanically engage an inner surface of the housing.

4. The stator support system of claim 3 wherein the inner surface of the housing includes a plurality of grooves for mechanically receiving the plurality of spaced cross support members.

5. The stator support system of claim 1 wherein the outer surface of the inner support tube is configured with a plurality of grooves for mechanically receiving the plurality of wedges.

6. The stator support system of claim 2 wherein the first edge of the plurality of spaced cross support members is configured with at least one tab.

7. The stator support system of claim 1 wherein the second edge of the plurality of wedges is configured with at least one notch.

8. The stator support system of claim 1 wherein the inner support tube is circular in cross section.

9. The stator support system of claim 1 wherein the wedges are formed of a non-metallic material.

10. The stator support system of claim 1 wherein the spaced cross support is formed of a high permeability material.

11. A stator support system for supporting a stator coil assembly surrounded by a housing, the support system comprising:

an inner support tube having an outer surface, the inner support tube is mechanically connected to the housing; and

a plurality of windings supported on the inner support tube.

12. A method for constructing a stator support system for supporting a stator coil assembly, the method comprising:

supporting a plurality of spaced windings on an outer surface of an inner support tube, spaces between adjacent windings defining a plurality of gaps;

positioning a plurality of wedges having a first and second edge, within the plurality of gaps, the first edge of each wedge is configured to mechanically engage the outer surface of the inner support tube; and

positioning a plurality of spaced cross support members over the spaced windings and extending perpendicular to a longitudinal axis of the stator coil assembly, the plurality of spaced cross support members having a first edge configured to mechanically engage the second edge of the plurality of wedges.

13. The method of claim 12 further comprising wrapping magnetic permeable wire over the plurality of windings, perpendicular to the longitudinal axis of the stator coil assembly between the spaced cross support members.

14. The method of claim 12 further comprising surrounding the stator coil assembly with a housing, the housing is mechanically connected to the inner support tube.

15. The method of claim 14 further comprising mechanically engaging a second edge of the plurality of spaced cross support members to an inner surface of the housing.

16. A stator coil assembly comprising:

a stator coil including at least one conductive winding;

an electrically insulating material disposed around the stator coil;

at least one cooling conduit for receiving a coolant from an outside source, the at least one cooling conduit disposed adjacent a first portion of an outer surface of the stator coil; and

a thermally conductive member disposed around the at least one cooling conduit and a second portion of the outer surface of the stator coil to transfer heat from the second portion to the at least one cooling conduit, thereby reducing the temperature gradient in the electrically insulating material.

17. The stator coil assembly of claim 16 wherein the cooling conduit is a thin walled, electrically resistive alloy.

18. The stator coil assembly of claim 16 wherein the cooling conduit comprises multiple passages extending therethrough.

19. The stator coil assembly of claim 16 wherein two cooling conduits are mounted adjacent the stator coil on opposing parallel faces of the stator coil.

20. The stator coil assembly of claim 16 wherein the thermally conductive member is porous copper.

21. The stator coil assembly of claim 16 wherein the electrically insulating material is provided at varying thicknesses within each stator coil, the thickness being proportional to voltage variations within the stator assembly, the maximum thickness being nearest the line voltage potential and minimum thickness being nearest the ground potential.

22. The stator coil assembly of claim 16 wherein theelectrically insulating material is glass backed mica tape.

23. The stator coil assembly in claim 16 wherein the thermally conductive member is in the form of a flexible tape, the flexible tape has a thermal conductivity of 140-375 W/m^{O}C and an electrical resistivity of 2.5 – 6.7 μΩm.

24. The stator coil assembly in claim 23 wherein the flexible tape is produced from graphite.